

THE FAYUM.¹

THE palæontological treasures yielded by the Fayum have made that Egyptian province no less famous among geologists and zoologists than are the "bad lands" of the United States territories, the Sevalik Hills, or Pikermi. The discoveries by Messrs. Beadnell and Andrews of extinct mammals, the study of which serves to clear up the whole question of the ancestry of that strangely specialised group the Proboscidea, are not of less significance than those which enabled Marsh and Huxley to demonstrate how the equally aberrant type of Equidæ originated.

We are glad to learn from the introduction to the present volume that the whole mass of palæontological material which has been obtained by the Egyptian Government has now been handed over to the authorities of the British Museum for the purposes of study and description. While the type-specimens will, we understand, be eventually deposited in the museum at Cairo, a good representative series of duplicates will be retained in this country.

Preliminary notices by Dr. Andrews and Mr. Beadnell himself concerning the osteology of some of these curious extinct forms of mammalian life have already appeared, but for the full details we must await the promised publications to be issued by the trustees of the British Museum. In the meanwhile, we welcome the volume before us, which gives a very clear and suggestive account of the general features of the district in which these splendid discoveries have been made.

The Fayum is a circular depression in the Libyan Desert, having an area of more than 3000 square miles, and is situated to the west of the Nile, some distance south of the latitude of Cairo. The lowest part of the district is occupied by the lake known as the Birket el Qurun, which has an area of between 80 and 90 square miles; but this area appears to be continually diminishing owing to evaporation. On the south-east side of the lake lies a tract of cultivated land, covered with alluvium similar to that of the Nile Valley, and having an area of about 700 square miles. The cultivated area is directly connected with the Nile Valley by a depression through which runs a natural canal—the Bahr Yusef—which conveys water to the Fayum and irrigates the whole of the district.

The remaining area of the Fayum is practically desert, the most interesting part of this desert area being two deep dry depressions in the south-west known as the Wadi Rayan and the Wadi Muêla. These depressions have attracted a considerable amount of attention from engineers in recent years, as being possibly capable of conversion into reservoirs for the purposes of irrigation.

Until the year 1898, when the examination was commenced by the Geological Survey of Egypt, little was known concerning the geology of this district. It was crossed in 1879 by Dr. Schweinfurth, who dis-

covered bones of the extinct cetacean Zeuglodon, and this seems to have been the first indication of the existence of vertebrate fossils in the district. Soon after the commencement of the survey by Mr. Beadnell, under the direction of Captain Lyons, the remains of fish and crocodiles were found to occur in the beds of the Middle Eocene, which had yielded the fossils found by Schweinfurth. A few fragments of bone were also found in the Upper Eocene strata, but it was not until 1901, when Dr. Andrews, of the British Museum, had joined Mr. Beadnell for the purpose of collecting recent North African mammals, that the outcrop of strata was crossed upon which a considerable number of mammalian and reptilian remains lay exposed, many in an excellent state of preservation. Energetic efforts on the part of the authorities of the British Museum and the Egyptian Government have resulted in the rich harvest of palæontological treasures now awaiting description, some of which are familiar to all visitors of the Natural History Museum at South Kensington. The study of these extinct types of mammals and reptiles, in addition to affording much new light on the evolu-



FIG. 1.—North side of the Birket el Qurun, looking West. From "The Topography and Geology of the Fayum Province of Egypt," by H. J. L. Beadnell.

tion of living forms, cannot fail to increase greatly our knowledge of the successive stages by which the present distribution of these forms of life has been reached.

The series of strata which have yielded the interesting vertebrate faunas is clearly described by Mr. Beadnell in the work before us. The beds are admirably exhibited in a number of fine escarpments. At the base are found Middle Eocene (Parisian) strata with an aggregate thickness of about 1300 feet. Nummulites and mollusca abound in these beds, which in their lower part contain Zeuglodon and fish remains, and in their higher portion the older of the two vertebrate faunas. The Upper Eocene (Bartonian) which overlies these have a thickness of 830 feet, and, with some remains of mollusca, yield the abundant remains of the second vertebrate fauna. No Miocene strata have been found in the Fayum, but about 100 feet of fluvio-marine beds, intercalated with contemporaneous (interbedded) sheets of basalt, and containing silicified trees, are referred to the

¹ "The Topography and Geology of the Fayum Province of Egypt." By H. J. L. Beadnell, F.G.S., F.R.G.S. Quarto. Pp. 101. Plates 24. (Cairo: National Printing Department, 1905.)

Oligocene (Tongrian). The youngest beds in the area are gravel terraces, lacustrine clays, deposited on the bed of the ever-diminishing lake, sands blown from the desert, and alluvial deposits.

Mr. Beadnell adduces evidence in favour of the view that the bodies of the animals the skeletons of which are found entombed in the strata of the Fayum were brought down from the African interior by a great stream which flowed in a north-westerly direction, passing through the ancient lake occupying the site of the Baharia Oasis. At that period the shore-line would be near the Fayum, and the Nile would flow into the sea near the same point.

In historical times, as is well known, a large part of the Fayum was occupied by the ancient Lake Moeris. By successive reclamations of the alluvial lands, this lake has probably been reduced to less than one-eighth of its original area, and now constitutes the comparatively insignificant Birket el Qurun.

The work before us appears in the same excellent form as the other memoirs of the Geological Survey of Egypt, issued under the direction of Captain

among the latter there are many examples that have been shown in the society's previous exhibitions.

Of the new work, the natural history section is by far the best represented. Miss Turner's set of photographs of the "great crested grebe," and a series of twenty-two lantern slides of butterflies by Dr. D. H. Hutchinson, have been awarded medals. The lantern slides are by the Sanger-Shepherd three-colour process, and illustrate the usefulness of this method for recording rare varieties. In some of the slides the colours are notably excellent, perhaps as perfect as any mechanical colour process will ever produce. Some of the photographs of "nesting swans" by Mr. Douglas English must have been taken at considerable risk, for in two or three of them the bird is shown flying at the photographer in anger. Another example (No. 237) will be found in the west room among the pictorial photographs, and close by (No. 216) is a very fine photograph of sea-gulls, the foremost of which are in the act of alighting on the water. Of other photographs that record slower movements, the chief are a series of seven by Mr. W. Farren of the "skin moult of the caterpillar of the privet hawk-moth," a series

of eight photomicrographs ($\times 30$) by Mrs. Kate J. Pigg showing the germination of a grass seed, and two photographs of the same oak, the one taken more than fifty years before the other, by Mr. J. B. Hilditch. The earlier photograph of the oak was exhibited at the first exhibition of the Royal Photographic Society (then the Photographic Society of London), and is at least as good a piece of work as the later, the main difference from a technical point of view being that the exposure necessary for the first was three thousand times as long as that given for the second. There are many other photographs of living things, but the bee photographs of Mr. Oliver G. Pike deserve special notice. The difficulty was to get light enough without causing the bees to stop their work, and Mr. Pike has succeeded.

Of other work in the technical section there are photomicrographs showing the structure of various metals and alloys by Mr. E. F. Law, some interesting wave photographs by Dr. Vaughan Cornish, and a number of radiographs by Dr. Thurstan Holland which well illustrate the possibilities of modern methods. The only "natural colour" photograph that we discovered, other than the transparencies by the Sanger-Shepherd method, is a three-carbon print by Mr. Brewerton. We think he has sent as good examples in previous years, but whether or not, what we want to show the capabilities of three-colour work are the finished print, produced without handwork, by the side of the object or painting that it represents. Some commercial work is excellent, but its measure of perfection is due to retouching.

The loan collection from the St. Louis Exhibition will doubtless prove more interesting to many than the new work, because of its greater variety. Some of these exhibits are of historic interest, such as Sir William Abney's photograph of the spectrum in the infra-red, and General Waterhouse's examples of photomechanical work. There are a very great many



FIG. 2.—Bahr Yusuf at Lahun before entering the Fayum. From "The Topography and Geology of the Fayum Province of Egypt," by H. J. L. Beadnell.

Lyons. There are sixteen plates reproduced from photographs, which give a good idea of the scenery of this wonderful district. We give reductions of two of the plates. In addition to these, there are two geological maps and six sheets of longitudinal sections. There are also woodcuts in the letterpress. The printing of the text of the work and the execution of the illustrations are highly creditable to the Survey Department at Cairo.

J. W. J.

THE ROYAL PHOTOGRAPHIC SOCIETY'S EXHIBITION.

THE fiftieth annual exhibition of the Royal Photographic Society is now open. There is a distinct and regrettable falling off in the number of exhibits in the section devoted to scientific and technical photography, but this is in a measure compensated for by the presence of the loan collection of British photographs of a similar kind that was sent to the St. Louis Exhibition last year, though

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